Quarks – What are they?
What do they represent?

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August 06, 2025

Abstract

The fundamental quark theory of the Standard Model has been expanding through experimental results and answering criticism, for more than half a century. We can therefore reasonably assume, based on historical precedent, that there is some basic aspect of existence that is instantiated by *"quarks".* The conjectural model here presented assigns the subjective components, C P T M S and L, as the identities of the six quarks, Up Down Strange Charm Top and Bottom (presently no known order of correspondence). The principal conjecture is that quarks represent solutions to problems in *"subjective physics"* that have consequences in the objective realm and thereby require geometric instantiation in some fashion.

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Subjective physics concerns the appearance of entities as they appear to other entities. A simple example will suffice to demonstrate what this means. We both look at the grass and say *"It is green"* … agreeing without reservation. However, we cannot know in principle exactly what the other person is seeing … only that there can be no actual quantitative contradiction. The other person could as well be seeing what another person calls *"red"* and is just verbalizing *"green"* by mutual convention. There is no way to prove the reality of anyone else's perception. Logic only requires quantitative agreement. Normally it makes no difference. However, when we combine the terms *"being"* and *"perception"* … with *"absolute chance"* there is a problem.

We cannot have existence without some factor that takes logic out of the *"thesis-antithesis"* lock. Nothing can move relative to another thing without an *"effective randomizer"* in the mix. The universe then displays logic and chaos in equal measures in order to *"effect"* existence.

"Being-perception" and *"form-interaction"* are logical congruencies. The one supposes the other. There can be no form if no interactions with that form occur. There is no 'being' if there is no one to perceive it.

When juxtaposed, our perception will not match the perception of others if perception is randomized in each being. The string bbbbbb… if randomized by flipping the handedness randomly to bddbdd … must match perception in all who see it or else objective reality is contradicted. That is, we cannot have one person see bbbbbb… (6 b's), while another sees ddbbbd… (3 b's and 3 d's). An individual may see all of existence as left-right reversed as a totality. In this case, there is a randomization without contradiction because two observers seeing oppositely … will agree on any quantities observed by calling them by the same name … by convention.

Thus, parity experiments that distinguish a universal preference for left over right may do so because the individuals perceiving the experiment have a randomized global perception of left and right, i.e. one sees a left-handed universe while the other sees a right-handed universe. The same logic applies to matter-antimatter. Half of observers see a matter universe and half see an antimatter universe but each calls what he sees by the same name … by convention.

To denote non-contradictory reality, we must *"geometrize preference"* … an impossibility. Preference for a 'd' or 'b' universe cannot be instantiated in geometry because preference has no physical form. It may, however, have a *"place, position",* i.e. within the particle.

Terminology for Symmetry Operations

Before proceeding into a discussion of symmetry problems, some possibly unfamiliar logical terms must be defined.

Let the word **"*conjugate*"** mean (for present purposes) ... the mated principle for its partner. Then we may say that electricity is the conjugate of magnetism and vice versa. Space is the conjugate of time and rotation is the conjugate of linear motion.

Let the term *"opposite"* have its common meaning. Then, a negative charge is the opposite of the positive charge. Left is the opposite of right and matter is the opposite of anti-matter.

Let a **"*reciprocal*"** be the analog of its partner in the alternative reference frame. Thus, *charge* (in the α-field Euclidean reference frame) has, as its reciprocal ... *mass* (in the spherical β-field reference frame). The *magnetic field* (in the α-field) has as its reciprocal in the β-field ... *rotation*.

A fourth term is required to differentiate an arbitrary relationship between two parameters that cannot, in principle, be directly detected but may have indirect experimental consequences. We will call this the **"*arbitrate*"** of its partner. An example would be to associate a lefthanded β-screw sense with a left-handed magnetic α-field, when there is no reason to choose left over right. The relationship is arbitrary and undetectable in the absolute sense.

The relationship chosen will be called the **"*dominant* arbitrate"** and the other not chosen will be the **"*causal* arbitrate"**, which is logically forced as the determinate partner to the random choice.

Law of Identity Revised

A revision of the Aristotelian law of identity is then in order …

> *"A thing may be itself and another thing at the same time in the same place,*
> *provided that both objects or attributes are of two opposite types*
> *... each of which is the logical referent of the other."*

Here, observers and observed are melded together as congruencies (being-perception, form-interaction). A thing **IS** … what another thing perceives it to **BE**. Given the simple symmetries available in 3-dimensional geometry we may lay out the six possible quarks as abstract *"names"* of particles which denote form and interaction as a congruency.

These are:
1. "C" … charge. A localized expansion or contraction in the α-field
2. "P" … parity. The handedness of rotation of the β-field
3. "T" … time reversal. The direction taken by the 'action' associated with movement. Action goes one way for matter and oppositely for anti-matter allowing for the observed cancellation or the entire particle with its antithet.
4. "L" … lepton. The electron-proton mass ratio changes with time. Which one gets more mass, and which gets less over time … instantiates the relationship between mass and charge. Does increasing mass go <u>with</u> the α-field charge or <u>against</u> it?
5. "M" … mass. The relationship of the α-field's uncertainty of position and the β-field's size (mass), i.e. if one is more is the other same or opposed?
6. "S" … spin. The relationship between the α-field's handed twists (magnetic field) and the β-field's rotation handedness, i.e. the same or opposed?

As far as presently reasoned, there are no further possibilities for subjective preferences in 3-space. Hence, only six types of quarks are possible. The point here is that these theoretical objects represent some logical attribute of existence and therefore can be understood in terms of geometry. Whereas mathematics is the descriptor of geometry … not the thing itself.

: The boson-fermion problem does not require a *"qualitative solution"* because that issue is resolved with the quantity of quarks present, i.e. odd or even number.

Viewing quarks as abstract names of particles leaves us with two possibilities for each quark type. There are then 2^6 non-contradictory permutations of the universe to be perceived simultaneously by anyone in any group of observers.

C+ or C-, P+ or P-, T+ or T-, M+ or M-, S+ or S-, L+ or L-
2 x 2 x 2 x 2 x 2 x 2 = **64** permutations

Any observer in 3-space may see the universe in any one of 64 possible mutually non-contradictory ways. Each will name what he sees by the same name as all other observers … by simple convention. The only evidence that this may be so … are the symmetry violations of the weak interaction.

For example … the weak interaction parity violation requires that we answer the question,

"Why is the universe left-handed when either is a viable possibility?"

All particles of the same type must have the same handedness because random being requires random perception (random form requires random interaction). If we can perceive individual particles randomly, they can exist randomly, and this leads directly to contradiction.

We cannot have two observers honestly reporting the same string bbddbdbdb… differently. For if one reports bbddbdbdb… and the other reports bbbbbbbbb… we have a contradiction which is forbidden by logic. The observers can only report bbddbdbdb… or ddbbdbdbd… without contradiction. They *"see"* differently but report same … by convention.

If two observers report a difference, there MUST BE a detectable *"causal reason"* for the difference that both observers can agree upon. A difference means a *"dominant arbitrate"* (random) and a *"causal arbitrate"* (forced to exist oppositely by logical deduction).

The Initial Neutral Particle

The present conjecture is that the initial particle would be classed as a spin-0 boson without chirality, charge or T-designation and having four quarks.

: It is experimentally impossible to determine if multiple quarks are present simultaneously … or … take turns *"existing"* in a time-sharing scheme.
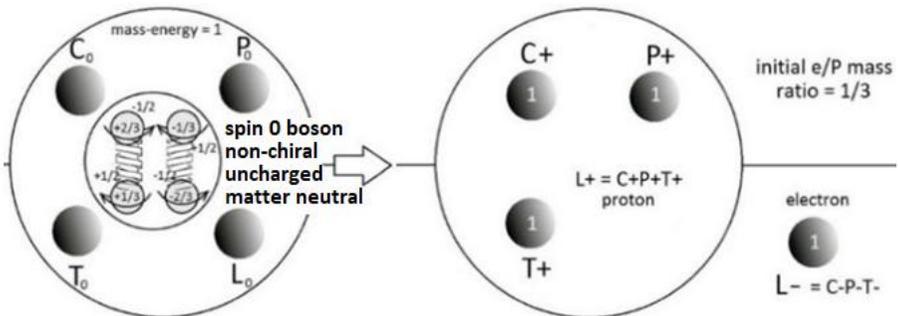

Two quarks will have charges of 2/3 and -2/3, and two will have charges 1/3 and -1/3. Two of these quarks will have spin 1/2 … and the other two spin -1/2, arranged such that no chiral object is formed. Two will be matter or T, and two will be anti-matter or -T. The reasons for this are not needed here and are very speculative. We are assembling a hypothetical model to show that actual modeling is possible.

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Neutron Decay

The initial neutron decays by way of the weak interaction, i.e. by uncertainty of position. The original state is $C_0P_0T_0L_0$. By ejecting the "L" quark, the remaining quarks are rendered C+P+T+ equaling L+, and the original L_0 is now L- ... equivalent to C-P-T-.

The α-field must do "*something*" to embody the change in the β-field due to acceleration. Therefore, the α-field will begin to form a charge over each focus ... one positive charge over one focus and a negative charge over the other focus. (*"which goes where?"*). Let the expansive charge be over the #2 focus and the contractive charge be over the #1 focus. Each focus is neither more nor less "real" than the other. They may therefore independently "*random walk*" away from one another by way of the "*strong interaction*", involving the randomness of the reaction velocity ... or ... by way of the "*weak interaction*", which involves the indeterminacy of position in the original construction previously generated.
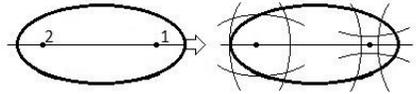
Why 1/3, 2/3 charges?
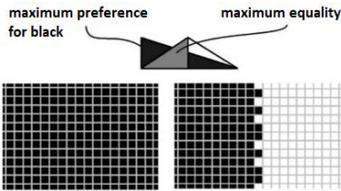
Consider a field of 'n' black and white squares.

If black is favored over white, the maximum preference for black is given when all 'n' squares are black ... symbolically given as the black right triangle.

If neither is favored, then the maximum show of equality occurs when half of 'n' is black and half white ... shown by the overlying isosceles triangle. If both parameters ... preference and equality are of equal importance ... then the maximization of both is the most probable configuration. This occurs at the charge state corresponding to the altitude at Q which can be calculated at 2/3 ... and if one is +2/3 its opposite will be -1/3 ... that is, 2/3 of 'n' will be black squares and 1/3 will be white squares ... or, vice versa.
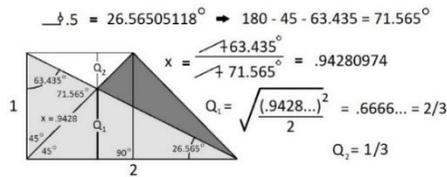
The most probable charge states over any finite time of observation are, therefore, those given in the standard quark model. This is the conjectured underlying logical cause of the fractional charges.

$$\phi.5 = 26.56505118° \rightarrow 180 - 45 - 63.435 = 71.565°$$

$$x = \frac{63.435°}{71.565°} = .94280974$$

$$Q_1 = \sqrt{\frac{(.9428...)^2}{2}} = .6666... = 2/3$$

$$Q_2 = 1/3$$

Conclusions

This is a highly speculative quark model that shows a possible path to understanding just what is going on at this level of inquiry with respect to the intrinsic fundamental logic of physics. To proceed theoretically one must propose some sort of model then throw stones at it until it crumbles from experimental contradiction. If anything remains standing from the original construction ... we take that as a foundation on which to build a new model ... at which more stones are thrown until there remains only an indestructible building worthy of the name *"truth"*. Alternatively, we can build a mathematical model and tune it to experimental results never understanding what that math stands for. This is the current modus operandi of theoretical physics ... mathematical consistency in lieu of philosophical understanding.

References

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